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ABSTRACT

It is understood that the Domain Working Groups (DWG), formed to review the Defence Capability Plan, are to meet regularly. An important consideration is how best to structure, organise and run DWG meetings so as to distil the best advice from the subject matter experts (SME) in each domain. Hence this report reviews, discusses and evaluates the following approaches to distilling SME knowledge: the Delphi Method; Cross-Impact Analysis (CIA); Facilitated meetings with and without computer support, as well as less-structured Rules-Based meetings; Decision Conferencing; group discussion techniques like Focus Groups and Nominal Group Technique; de Bono's Six Hats; and finally, Story Circles. Other aspects of groups discussed in this report include Communities of Practice, Group Think and Trust.

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Executive Summary

The Defence Capability Plan (DCP) provides detailed, costed planning for development of Australia's military capabilities for 10 years into the future. It is reviewed annually to take account of changing strategic circumstances, new technologies and changed priorities. Also included in the development of the DCP are through-life-costing estimates for new investments.

To facilitate its analysis, Defence Capability has been partitioned into six broad capability groupings, called Domains, each with specific capability goals. These domains are: Aerospace, Maritime, Land and Littoral, Strategic Strike, Information and Support to Operations. The analysis sought includes capability guidance, gap assessment and options development. For each domain a working group has been established to provide expert advice relevant to that domain but with a joint focus.

There is a view that the current domain structure is satisfactory but the system for managing the DWG could be improved. Concerns raised include the potential for:

- The DWG to become 'stove-piped' and fail to take a joint view.
- A focus on existing projects rather than broadly considering alternatives.
- The DWG to undertake an advocacy role for the projects within their domains.
- An individual to dominate a DWG.
- Groupthink.

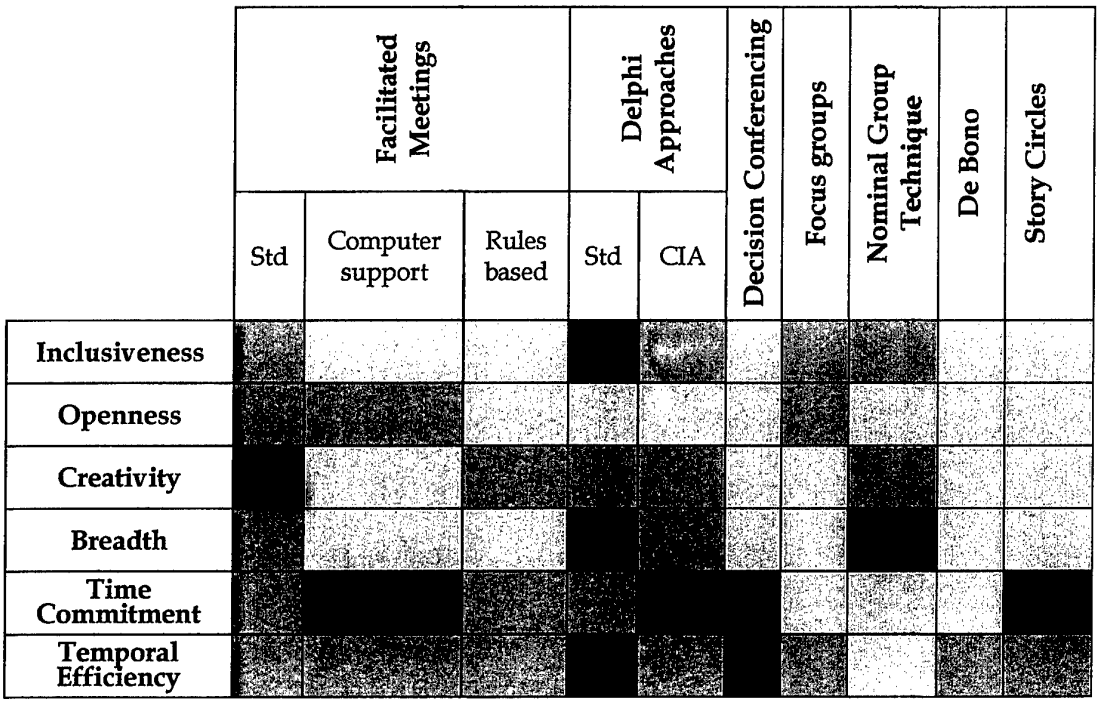
Thus the issue that emerges is how best to structure, organise and run DWG meetings so as to distil the best advice from the subject matter experts (SME) in each domain. To this end the following established practices for distilling SME knowledge are discussed and evaluated: the Delphi Method; Cross-Impact Analysis (CIA); Facilitated meetings with and without computer support, as well as less-structured Rules-Based meetings; Decision Conferencing; group discussion techniques like Focus Groups and Nominal Group Technique; de Bono's Six Hats; and finally, Story Circles. Other relevant aspects discussed include Communities of Practice, Groupthink and Trust.

Six attributes were chosen to cover the concerns raised by stakeholders and provide some means to assess process efficiency and the efficacy of decision-making. They were:

1. The 'Inclusiveness' attribute which assesses the degree to which all participants are included in the meeting in an effective and balanced way.
2. 'Openness', i.e. the ability of the approach to generate an environment where participants can talk freely and frankly, without fear of blame or ridicule.

3. 'Creativity' for estimating the degree to which the approach creates an environment that facilitates creative thought and innovation.
4. 'Breadth' to determine whether or not a broad range of topics or issues can be dealt with and a wide range of options evaluated.
5. 'Time Commitment' which refers to the total amount of time participants must commit to the process.
6. 'Temporal Efficiency' to assess how efficiently time is used during group meetings.

The results of the evaluation are shown in the following table where RED denotes that the approach is evaluated as being unlikely to adequately meet the criterion; AMBER indicates it may meet the criterion to some extent and GREEN signifies that the approach is likely to meet that criterion effectively.



In choosing an appropriate approach for running and managing the DWG it is worth noting that:

- Computer support for facilitated meetings can significantly improve their inclusiveness, creativity and breadth.
- The Delphi method has some serious deficiencies with respect to efficiency (time use and management) and its ability to broadly consider alternatives.
- While both Decision Conferencing and Story Circles look promising they can involve a considerable time commitment and could be inefficient if not effectively applied.

As the approaches outlined have often been developed and applied in situations, organisations and contexts markedly different from those of the DWG, it would be advisable to test and prototype the approach chosen before adopting it. Here two approaches may be considered:

- Select an existing DWG as the subject for test and prototyping.
- Synthesise a DWG for testing and prototyping.

It is further recommended that consultants familiar with the approach chosen be hired to prototype, develop, tailor and set-to-work the method for use by the DWG.

Contents

1. Background

1.1 The Defence Capability Plan

Following the Defence White paper of 2000 a new approach to Capability Planning was introduced (Australian Department of Defence 2000). The aim is to provide the Australian Defence Force (ADF) with clear, long-term goals for the development of appropriate military capability consistent with the Government's strategic policy for Defence and within fiscal guidelines. The new process is intended to produce a Defence Capability Plan (DCP) that provides detailed, costed planning for development of Australia's military capabilities for 10 years into the future. The DCP is not static but is to be reviewed annually to take account of changing strategic circumstances, new technologies and changed priorities.

The expectation is that the DCP will:

- Allow development of robust plans for the future shape of the ADF that are affordable.
- Allow the Government to set firm financial constraints for Defence.
- Provide benchmarks against which the Australian Defence Organisation's performance will be measured.

Included in the development of the DCP are through-life costing estimates that take account of personnel, operating, support and upgrade costs over a 20-year period as well as the initial capital investment (Australian Department of Defence 2000).

1.2 Domains

Defence Capability has been partitioned into six broad capability groupings, called Domains, with specific capability goals. These are: Aerospace, Maritime, Land and Littoral, Strategic Strike, Information and Support to Operations. Within each domain sub-domains have been identified although the sub-domain categories and structure are still subject to debate and some revision (DCPG Forum 2003).

The purpose of partitioning Defence Capability into domains is to facilitate capability analysis.[1] The analysis sought includes capability guidance, gap assessment and options development. Analysis of domains can occur through either working group meetings or experimentation. The role of experimentation for the whole-of-force level evaluations is a matter for further consideration, as is the issue of attributing resources to domains (Dunn 2003).

[1] It is argued that a whole-of-force level analysis is too complex to conceptualise or present.

1.3 Domain Working Groups (DWG)

For each domain a working group has been established to provide expert advice for the annual review of the DCP. The domain working groups (DWG) are intended to have a joint focus and should be interpreted on the basis of the physical domain in which the effects occur - where the adversary is and not where the assets might be (Matthews 2003).

There is a view that the current domain structure is satisfactory but the system for managing the DWG could be improved. It has further been suggested that documentation is poor and the working groups can stall owing to limited availability of resources and compressed timeframes. Experience to date has shown that the DWG can end up undertaking an advocacy role for the projects within their domains - a function not intended to be part of their charter (Matthews 2003).

1.4 Scope of this paper

It is understood that the DWG will have regular meetings and that the current issue to be addressed is how best to structure, organise and run the meetings so as to distil the best advice from the subject matter experts (SME) in each domain. Consequently other methods of distilling advice from SME, such as single questionnaires, interviews and consultancies will not be examined in this paper.

As clearly stated functions for the DWG were not found during a literature search it was assumed that they have been set-up primarily to:

- Distil the best advice from a community of SME through representatives sent to a DWG meeting.
- Facilitate a common position on issues related to Capability Planning for their domain.
- Make appropriate recommendations that include addressing Defence White Paper issues such as:
    - The effects of changing strategic circumstances on capability planning for the domain.
    - The likely impact of new technologies.
    - Changes in priorities to be considered.

As it was not clear what the expected outputs are from the DWG, the type, format and processes for such meetings were considered in the light of these potential functions. The techniques for distilling SME knowledge discussed in this paper include: the Delphi Method; Cross-Impact Analysis (CIA); Facilitated meetings with and without computer support, as well as less-structured Rules-Based meetings; Decision Conferencing; group discussion techniques like Focus Groups and Nominal Group Technique; de Bono's Six Hats and lateral thinking; and finally narrative patterning approaches such as Story Circles. In Section 8 other considerations are raised including Communities of Practice, Groupthink and Trust.

2. Delphi Method

The Delphi method uses group participation within a panel of SME to deal systematically with a complex problem or task. It involves the use of a set of questionnaires sent to a pre-selected group of SME. These questionnaires are constructed to extract individual responses from the SME in relation to the problems posed and thereby permit the SME to further refine their views as the group's work progresses in accordance with the assigned task (IIT 2003a).

Responses to the first questionnaire are summarised and used to construct the second questionnaire, which presents the results of the first and gives participants an opportunity to refine their responses, clarify issues, identify areas of agreement or disagreement, and develop priorities. This interactive process can be repeated as many times as appropriate (Ziglio 1996).

2.1 Delphi Process

Fowles (1978) describes the following ten steps for applying the Delphi method:

1. Formation of a team to undertake and monitor a Delphi on a given subject.
2. Selection of one or more panels to participate in the exercise. Customarily, the panellists are experts in the area to be investigated.
3. Development of the first round Delphi questionnaire.
4. Testing the questionnaire for proper wording (e.g., ambiguities, vagueness).
5. Transmission of the first questionnaires to the panellists.
6. Analysis of the first round responses.
7. Preparation of the second round questionnaires (and possible testing).
8. Transmission of the second round questionnaires to the panellists.
9. Analysis of the second round responses. (Steps 7 to 9 are reiterated as long as desired or necessary to achieve stability in the results.)
10. Preparation of a report by the analysis team to present the conclusions of the exercise.

Delbecq et al. (1975) stated that the most important issue in this process is the understanding of the aim of the Delphi exercise by all participants. Otherwise the panellists may answer inappropriately or become frustrated and lose interest.

Questions that should be asked before deciding whether or not to use the Delphi technique include:

- What is the type of group communication process to be used?
- Who are the Subject Matter Experts and where are they located?
- What alternative techniques are available and what results can reasonably be expected from their application?

The outcome of a Delphi sequence is opinion and the results of the sequence are only as valid as the opinions of the experts who made up the panel (Martino 1978). The panel viewpoint is, however, summarised statistically rather than in terms of a majority vote.

2.2 Support of Delphi

The Delphi method recognises human judgement as legitimate and useful inputs for generating forecasts. It was developed to overcome the problems associated with bias from single experts, group sessions suffering from "follow the leader" syndrome and a reluctance to abandon previously held opinions (IIT 2003a).

The objective of the Delphi method is to overcome the disadvantages of conventional committee action. According to Fowles (1978) anonymity, controlled feedback, and statistical response characterise Delphi. Group interaction in Delphi is anonymous, as the feedback of comments and forecasts are not linked to the originator.

Delphi's key components are structuring of information flow, feedback to the participants, and anonymity for the participants. These components offer distinct advantages over the usual group conference sessions and enable the problems associated with group dynamics to be bypassed. A facilitator usually removes material that is no longer relevant to the outcome of the session. It is the job of the facilitator to ensure that the Delphi session remains focussed and achieves its desired outcome.

The literature supports the use of Delphi in answering one, specific, non-complex question. There appears to be less support for its use to determine complex forecasts concerning multiple factors. Such complex model building is more appropriate for quantitative models with Delphi results serving as inputs. Gordon & Hayward (1968) support this view and claim that the Delphi method, based on the collation of expert judgement, suffers from the possibility that reactions between forecasted items may not be fully considered.

2.3 Criticism of Delphi

Criticism of Delphi has come from a number of sources (see IIT 2003a) including claims that the method is unscientific (Sackman 1974) and concerns regarding its accuracy. Martino (1978) regards Delphi as a method of last resort in dealing with extremely complex problems for which there are no adequate models.

Makridakis and Wheelright (1978) summarise the general complaints against the Delphi method in terms of:

- A low level reliability of judgements among experts and therefore dependency of forecasts on the particular judges selected.
- The sensitivity of results to ambiguity in the questionnaire that is used for data collection in each round.
- The difficulty in assessing the degree of expertise incorporated into the forecast.

Martino (1978) expressed his concerns regarding the use of Delphi as follows:

- The most important decision to be made by the facilitator is the selection of the panel members.
- Care needs to be taken to ensure there is a minimum of common or cultural bias in the panel.
- Complex or difficult to use questionnaires impede the progress of the Delphi sequence.
- During a Delphi sequence, the facilitator may feel the need to alter the responses to overcome a partial impasse thus distorting the basis of the Delphi process.
- Need to avoid ambiguity in the statement of events comprising the questionnaire.
- Need to achieve a balance between too much information and not enough in an event statement.

2.4 Cross-Impact Analysis (CIA)

A criticism of the Delphi technique is that it only produces isolated forecasts. By this, it is meant that events and trends tend to be predicted independently of each other. There is no reference made or incorporated into the forecast of possible correlations between events and thereby how they may influence each other. Whereas Delphi provided a simple method for forecasting, there are clearly situations where interdependencies between events need to be taken into consideration to be able to obtain a more consistent and accurate forecast (IIT 2003b).

It has been suggested that integrating techniques such as Cross-Impact Analysis (CIA) with the Delphi method improves its forecasting reliability by taking into account that the occurrence of one event may have an effect on the probability of occurrence of related events (Gordon 1994; Gordon & Hayward 1968).

CIA is a technique that may be used to include possible interaction between events. The technique attempts to show the conditional probability of an event, given that various other events have or have not happened.

Use of Cross-Impact Analysis

CIA uses the following procedure for evaluating future situations (IIT 2003b):

1. Define the events and trends to be included in the analysis.
2. Define the planning interval and subintervals, i.e. 'scenes'.
3. Develop cross-impact matrices to define the interdependencies between events and trends.
4. Estimate the entries in the cross-impact matrix.
5. Estimate the initial occurrence probabilities of each event in each scene.
6. Estimate the value of each trend at the beginning of each scene.
7. Perform a calibration run.
8. Define the policies, actions, or sensitivity tests to be run with the matrix.
9. Perform the cross-impact calculations.
10. Evaluate results.

Fowles (1978) states that the initial occurrence probabilities of events, values of trends, and the magnitude of impacts between the variables may be estimated by individual SME. A more accurate or appropriate technique would be to use a Delphi sequence with SME to collect these judgments.

It should be noted that:

1. Including those developments with the greatest expected impact on the forecasts outcome is critical (Fowles 1978).
2. To develop causal relationships, sequencing between events (i.e., relating them temporally) needs to be incorporated.
3. The estimate of the initial probability of each event indicates the likelihood that each event will occur by some future year.
4. Conditional probabilities may be estimated by asking the question, 'If event *m* occurs, what is the new probability of event *n*?' Entries in the cross-impact matrix may be evaluated by asking this question for each combination of occurring event and impacted event.
5. A calibration run of the cross-impact matrix is usually undertaken. This is undertaken in a computer program where the impact probabilities are determined.
6. Sensitivity testing is used to gain insight as to the importance of judgments (an initial or a conditional probability estimate) that have been made. A selected judgment is changed and the matrix repopulated.

In practice, 20 to 30 developments (events and trends) need to be taken into account for a typical planning process. Since the number of event pair interactions to be considered increases rapidly as the number of events increases, computational complexity rapidly escalates to the point where computer simulations are the only realistic method of doing the CIA.

Advantages & Limitations

The cross-impact method focuses attention on chains of causality: *x* affects *y*; *y* affects *z*. Problems arise when the input to a cross-impact matrix falls outside of acceptable probabilistic bounds or the cross-impact run produces an unexpected result.

The method, however, allows for sensitivity and policy change testing thereby allowing insight into both the basis of judgments and the complex causality chain of events that a policy change may initiate.

Owing to the complexity of these cross-impact analyses, a number of computer simulations are usually used in the analysis. Even 20 to 30 developments involve a complex set of calculations. For more complex situations supercomputing approaches would be needed.

3. Facilitated Meetings

Facilitated meetings follow a process designed to achieve a consensus view orientated toward action.[2] Such meetings attempt to provide a democratic-style environment for the meeting where form and content are intimately linked. The main goals of this facilitated process are to:

1. Allow everyone present at the meeting to participate in discussion and decisions.
2. Keep discussions focussed on the topic at hand.
3. Prevent individuals from dominating proceedings.
4. Run the meetings to an agenda and schedule.
5. Ensure there is a plan and mechanism for implementing agreed actions.

Experience has shown that well-run facilitated meetings provide a process where:

- People more regularly and willingly attend meetings.
- Leadership is both developed and distributed.
- Work is well distributed between group members.

3.1 Form and Format of Meeting

The preferred way of arranging participants at a facilitated meeting is sitting them in a circle. Practically this allows all participants to more readily see and hear others, symbolically it promotes democracy through equality of their sitting position in the meeting.

Facilitated meetings need a:

- Facilitator who knows how the process works and is not inclined to dominate discussion.
- Timekeeper to ensure discussion on agenda items is completed within the allocated time.
- Stack-keeper who takes note of the people who wish to talk on a topic and calls on them in order.
- Note-taker to record what happens at the meeting, in particular agreed positions and actions.

For small meetings the facilitator can also be the timekeeper and stack-keeper (and even note-taker). In larger meetings it is best to distribute these tasks.

Important protocols for facilitated meetings include:

- Starting meetings on time with all participants present.
- Introductions at first meeting and meetings where there are new members.
- Active listening and disciplined talking, displaying both courtesy and respect to other members. Rules include:
    - Only one speaker at a time.

[2] They can also be used for discussion groups where no consensus is required or no action planned.

  - Limits on speaking time.
  - No interrupting speakers.
- Keeping to the tasks at hand.

A simple and clear description of how to run a facilitated meeting is provided at the Green Party (2003) website.

3.2 With Computer Support

It is claimed that facilitated meetings can be further improved through the use of computer-based tools (Collins 2003). The primary use of computer-based tools is to undertake the administrative tasks of information management and recording allowing the facilitator to focus on the interaction of participants and the overall dynamics of the meeting. Computer support also allows more than one person at a time to communicate their ideas, opinions and make comments.

At a facilitated meeting with computer support each participant has a notebook computer to enter comments on the topic being addressed and indicate whether or not they support proposals and recommendations. All ideas, opinions and comments inputted are recorded interactively and made available to all participants as they are generated. They can be attributed to individual participants, a group of participants or anonymously depending upon the nature of the meeting and the preferences of the participants.

Proponents of facilitated meetings with computer support claim that the inclusion of computer support in such meetings:

- Ensures that nobody's input is overlooked or lost.
- Can generate more ideas, concepts and comments in the allocated time as all participants are continually communicating information through their computer terminal.
- Encourages more interaction and participation of people who are naturally reticent to speak at meetings.
- Facilitates rapid and efficient communication and consideration of ideas.

Concerns may be raised that the use of computers:

- Distracts participants from the task at hand.
- Discourages discourse.
- Generates too much information.

Collins (2003) addresses these issues and claims that, in his experience, computer support helps keep participants on the task at hand, focuses verbal discussions on the main issues and ensures more information is collected and considered.

3.3 Rules-based Meetings

A less-structured way of running a meeting that includes some of the same protocols used for facilitated meetings is a rules-based meeting. The meeting is run according to a set of rules that are circulated to the participants and strictly adhered to.

These meetings are not necessarily facilitated, although it may be useful to appoint someone to be the 'rules enforcer' for the first few meetings until habitual behaviour adapts to the new protocols.

Rules may vary depending on the requirements of the meeting and the context, but could include, for example:

- No rank or superior authority recognised within the meeting (except for the Chair and rules enforcer, when necessary)
- Everone to be addressed by their first name and not by rank
- Only one speaker at a time.
- Maximum limits on speaking time.
- No interrupting speakers.
- No ridicule, fault-finding, blame or shame to be expressed
- Problems and solutions are owned by the whole group and not by individuals or by services
- Meeting outcomes (decisions and outcomes) are to be agreed and recorded during the meeting
- Everyone to be responsible for conforming to the rules, and objecting when rules are breached

Where participants observe that some of the rules appear to inhibit creativity and problem solving or invite Groupthink (see Section 8.2), rules can be modified and evolved until the optimum rule set has been developed.

4. Decision Conferencing

Decision conferencing was developed in the late-1970s in response to the difficulties faced when conducting decision analysis for problems where there are multiple stakeholders with different perspectives of an issue (Enterprise LSE 2003). It is claimed that decision conferencing may be applied to major issues in operations; planning or strategy faced by many private and government organisations. Specifically mentioned by the proponents of this approach is 'evaluating the effectiveness of government policies, schemes and projects'. The stated purposes of decision conferencing are to provide the means to:

1. Arrive at a shared understanding of issues.
2. Develop a common position.
3. Achieve commitment to action.

The process involves running a series of intensive working meetings that focus on a complex issue facing an organisation. The meetings have no fixed agenda and are conducted as working sessions lasting one to three days. There are four stages to the process:

1. Broad exploration of the issue(s) being considered.

2. Construction of a model incorporating available data and participants' judgements of the issue(s) that attempts to capture all key perspectives. Here information technology is used to develop, record and revise the model.
3. Determining consequences of the model and examining the differences between results from the model and participants' judgements. This is an iterative stage involving revision and refinement of the model.
4. Summarising key considerations and conclusions, agreeing on a set of recommendations and developing an implementation plan.

To run a decision conference two facilitators from outside the organisation are enlisted. Their main tasks are to understand the group dynamics, provide structure to the meetings and intervene when necessary to ensure participants keep to the task at hand. They do not contribute data or expert judgement to the model being developed. The function of this model, developed using information technology, being to provide a high-level view that can be used for sensitivity analysis and thus resolve differences in opinion between participants and facilitate agreement on a preferred position or way ahead.

It is claimed that decision conferencing helps organisations to (Enterprise LSE 2003):

- More readily explore, and think creatively about, complex issues.
- Arrive at better and more acceptable solutions.
- Reach agreement more quickly.

Decision conferencing evidently works best in organisations where the following conditions are met (Enterprise LSE 2003):

- There is a style of decision-making that allows for consultation and deliberation.
- There are communication links across divisions and departments that permit information to flow laterally as well as vertically.
- A climate of problem solving exists that allows options to be feely explored.
- Authority and accountability are well distributed throughout the organisation.

5. Group Discussion Techniques

Group processes such as, staff meetings, committees, working groups and tiger teams dominate organisational life. The type of communication within and across such groups often serves as a barometer of the overall organisational communication climate. Many new ideas, which may not occur to individuals when they work on their own, are created within groups. Members of a group are prompted by what others in the group say or suggest and it is in groups where disparate ideas are linked to form new ideas. Because organisational decisions and choices are often based on the outcomes of these groups, it is important that both inputs and outputs are of high quality.

5.1 Focus groups

A focus group comprises 6 to 12 participants, guided by a moderator, and is used to gain insights into and understanding of participants' attitudes towards and perceptions of a given topic (Gorman & Clayton 1997). These views, even when formed independent of a group, may be revealed via the interaction that happens in a group setting (Morgan 1997). The usual process involves preparing a number of questions related to the topic or issue to be discussed. The questions should be clear, unambiguous and chosen so as to cover aspects of interest. These prepared questions can be supplemented with follow-up questions known as 'probes'. The objective of the focus group is not to provide a definitive answer but rather to explore and elicit detailed information, clear-up ambiguities and provoke discussion among participants on the topic at hand. The moderator may use probes such as 'Could you tell me why you think that?' 'Can I pick up on something that the previous speaker said?' or 'This raises another important point.' The outcome from a focus group largely depends on the skill of a moderator. A skilful moderator facilitates lively discussion involving all participants (Gorman & Clayton 1997).

Recording of data

There are four commonly adopted ways of recording focus group discussions:

- Tape recording gives a faithful reproduction of what has happened during a focus group session. Although it may be difficult to transcribe such a recording when discussion is lively, tape recording can still serve as a useful *aide-memoire*.
- Notes taken during the meeting are particularly useful. For a moderator to listen to what has been said, ask questions, oversee the discussion and take notes is, however, a near-impossible task.
- Notes taken immediately after the session can supplement and elaborate on cryptic notes taken during discussions. It is considered important that a moderator takes time to make notes immediately after focus group discussions.
- Notes taken by a scribe during the discussion is an efficient way of recording discussion providing that the scribe is well briefed on the purpose of the session. Such a record may be further enhanced through a debriefing session between moderator and scribe.

Advantages of focus groups:

- Requires only a moderate time commitment from both the facilitator and participants.
- Provides an opportunity for all participants to be involved in decision-making (empowerment).
- Encourages interaction amongst participants facilitating clarification of differences of opinion and the emergence of a range of beliefs and attitudes.
- Can provide an opportunity to observe and record non-verbal communication.

Limitations of focus groups:

- Success or failure depends on the skill of the moderator.
- There may be difficulties in getting a representative cross-section of people.
- The need to control dominating personalities.

5.2 Nominal Group Technique (NGT)

The Nominal Group Technique (NGT) is a structured method for working toward consensus; it is sometimes referred to as 'quality brainstorming'. NGT takes advantage of the 'pooled' judgments of a variety of people with varied talents, knowledge, and skills. By doing this, the resulting ideas are likely to be better than those that might be obtained by other methods. NGT uses a structured format to obtain multiple inputs from several people on a particular problem or issue. The process also prevents the domination of discussion by a single person, giving everyone in the team an equal voice in sharing ideas and encouraging the more passive group members to participate. Furthermore, NGT is not reliant on an experienced facilitator and results in a set of prioritised solutions or recommendations (Gorman & Clayton 1997; Dunham 1998).

In NGT an open-ended question is put to the group and then:

- Each group member spends several minutes in silence individually brainstorming all the possible ideas and jots these ideas down.
- The ideas are then shared in round-robin fashion (one response per person each time). All responses are recorded on a board, a flipchart or a large piece of paper (it is important that all the participants see the responses clearly). No criticism or discussion is allowed at this point of time, but clarification in response to questions is encouraged.
- Discussion of ideas.
- Each participant evaluates the ideas and individually and anonymously rates their relative importance (for example, the best idea gets 5 points, next best 4 points, etc).
- The votes are shared within the group and tabulated. A group report is prepared, showing the ideas receiving the most points.

'Round-robin' reporting of ideas means that the facilitator goes around the group, asking each person in turn to suggest an idea. If an idea has already been put forward, they ask for another; if it appears to overlap with one already suggested, the facilitator asks for clarification of whether or not it is the same and accepts the judgement of the person suggesting it. The facilitator may allow a person to 'pass' if they cannot suggest a different idea. It is, however, important that the facilitator does not dominate the session or rephrase the ideas put forward to represent the facilitator's own ideas. Group ownership of ideas is vital.

During the discussion phase the facilitator may number each of the items as they are discussed (Here the facilitator takes charge of the process only to the extent of asking questions such as 'Does everybody know what this means?' or 'Is there an overlap between the two – what do you think?').

Participants are asked to decide upon the five most important suggestions the group has made by placing one suggestion on each card. They are then asked to rank the five items they have selected. The ranking sequence is the easiest way of ensuring that all

participants make considered and careful selection of the available options. In the final stage, the cards are collected, shuffled to preserve anonymity and one of the group members reads out item numbers and the corresponding ranking while the facilitator records these on the board. A tally of votes is made to identify the highest-ranking ideas put forth.

Like every method, NGT has some limitations. These are:

- NGT tends to be limited to a single-purpose, single-topic meeting; it is difficult to change topics in the middle of the meeting.
- All participants must agree to use the same structured method.

6. de Bono's Six Hats and Lateral Thinking

Edward de Bono is generally thought to be a leading authority in the field of creative thinking and the teaching of thinking as a skill (de Bono 2003). He has developed a number of techniques to facilitate meetings and enhance creativity; this section discusses two of them.

6.1 Six Thinking Hats

The Six Hats technique forces meeting participants to learn how to separate thinking into six distinct categories. Each category is identified with its own coloured, metaphorical 'thinking hat'. By mentally wearing and switching 'hats' participants can easily focus or redirect their thoughts, the conversation, or the meeting.

In this way, the technique can be used as a:

- Meeting-facilitation tool.
- Team productivity or communication tool.
- Creativity enhancer.
- Control mechanism used to optimise and organise a person's thoughts and therefore help make decisions and solve problems (APTT 2003).

The Six Hats technique is a cooperative tool rather than an adversarial tool. The hats are not categories or labels for people; rather than limit people, the aim of the Six Hats is to get them to use all of the hats and expand their understanding. For example, in a normal meeting, it is easy for someone to look for negatives if they do not support an idea - the Six Hats technique challenges participants to see all sides of an issue (Palmer 1997).

6.1.1 The Six Hats (or thinking modes)

The different colours represent metaphorical hats that a thinker can put on or take off to indicate the type of thinking they are using. Typically, each hat is used in turn. The following explanations are derived from APTT (2003) and Palmer (1997):

The White Hat
The White Hat calls for information known or needed. While wearing the white hat arguments and proposals are ignored, the known facts, figures and information are examined, and the information still required is identified, as are the means of acquiring it. Typical questions are:

- What information do we have here?
- What information is missing?
- What information would we like to have?
- How are we going to get the information?

The Red Hat
The Red Hat signifies feelings, hunches, and intuition. This hat permits people to put forward their feelings without the need for apology, explanation or any attempt to justify them. Intuition is a composite judgement based on years of experience, and it can be valuable even if the reasons behind it cannot be spelled out consciously.
Typical statements may begin in the following way:

- Putting on my red hat, this is what I think about the project ...
- My gut feeling is that it will not work ...
- I don't like the way this is being done ...
- My intuition tells me that prices will fall soon ...

The Black Hat
The Black hat is the logical-negative - the devil's advocate or why something may not work. It is the hat of caution & critical judgement. It is the most used hat, and perhaps the most valuable hat, as mistakes may be disastrous. At the same time, it is very easy to overuse the black hat and kill creative ideas with early negativity.
Typical comments may be:

- The regulations do not permit us to do that.
- We do not have the production capacity to meet that order.
- When we tried a higher price the sales fell off.
- He has no experience in export management.

The Yellow Hat
The Yellow hat symbolises brightness and optimism. It is the logical-positive view of things. It looks for feasibility, and how something can be done. It also looks for benefits, but they must be logically based.
Typical comments may be:

- That might work if we moved the production plant nearer to the customers.
- The benefit would come from repeat purchases.
- The high cost of energy would make everyone more energy efficient.

The Green Hat

The Green hat focuses on creativity: possibilities, additional alternatives, and new ideas. Putting on the green hat makes time and space for creative effort. This is where participants engage in lateral thinking and other creative techniques

Typical questions may be:

- Does anyone have some new ideas here?
- Are there any additional alternatives?
- Could we do this in a different way?
- Could there be another explanation?

The Blue Hat

The Blue Hat is used to manage the thinking process. It is the thinking overview or process control hat and is usually used by the chairperson of the meeting. The Blue Hat thus: sets the agenda for thinking; suggests the next step in the thought process; asks for summaries, conclusions and decisions.

Typical comments may be:

- We have spent far too much time looking for someone to blame, let's move on.
- Could we have a summary of your views?
- I think we should take a look at the priorities.
- I suggest we try some green hat thinking to get some new ideas.

In a meeting, participants can be asked to 'put on' different hats in a sequence to aid the problem-solving process. Sometimes it is possible to put together a sequence of hats that will assist in thinking productively about some matter. The actual order will vary with each situation, but, for a new matter, the sequence might be:

- White - to get information;
- Green - for ideas and proposals;
- Yellow followed by Black, on each alternative - to evaluate alternatives;
- Red - to assess feelings at this point;
- Blue - to decide what thinking to do next.

For a well-known proposal, the sequence of hats might run:

- Red
- Yellow
- Black
- Green (to overcome negative points)
- White
- Blue

For DWG meetings, it may also be useful to add a seventh - purple - hat that takes the 'Joint' view of the issue under discussion and looks at issues of interoperability across domains and compatibility within the domain.

6.1.2 Advantages and Limitations

The six hats and lateral thinking technique of de Bono is useful for looking at the effects of a decision from a number of different points of view. It forces participants to move outside their usual thinking style thus facilitating a broader view of a situation.
There is, however, no correct or preferred sequence when using the hats. The order in which the hats are used should thus be tailored to the subject and the way in which it is being explored.
This technique opens up the opportunity for creativity within decision-making by augmenting rational arguments with intuition, scepticism and other human reactions and emotions. It can help usually pessimistic people to be more positive and creative.
A lot of ideas can be generated in a short time but this can be handled by restricting the time spent on each hat; as little as 10-15 minutes for each hat can be sufficient to capture the different perspectives present in the group.

The main disadvantages of de Bono's technique are:

- It was developed for, and is best suited to, face-to-face meetings.
- There must be disciplined use of time so that each 'hat' is used. With practice and experience the time allocated may be shortened to give a clearer focus on each hat.
- Each participant must make a deliberate effort to think in only one 'direction' at a time.

6.2 Lateral Thinking

Edward de Bono divides thinking into two major modes. He calls one 'vertical thinking', which uses the processes of logic - the traditional, historical method. He calls the other 'lateral thinking,' which involves disrupting an apparent thinking sequence and arriving at the solution from another angle. De Bono identifies four critical factors associated with lateral thinking:

- Recognising dominant ideas that polarise the perception of a problem.
- Searching for different ways of looking at things.
- Relaxation of rigid control of thinking.
- Use of chance to encourage other ideas.

This last factor has to do with the fact that lateral thinking involves low-probability ideas that are unlikely to occur in the normal course of events. The tools de Bono suggests for enhancing lateral thinking and creativity centre around the following:

- **Alternatives:** extracting concepts from current ideas to generate more alternatives. Sometimes people have a tendency not to look beyond the obvious alternatives.

- **Focus:** defining a focus and then sticking to it when generating ideas. This also involves knowing when and how to change the focus of thinking.

- **Challenge:** breaking free from the limits of traditional thinking. Act as though the present way of doing things is not necessarily the best.

- **Random entry:** using unconnected, random input to open up new lines of thinking.

- **Provocation and movement:** generating provocative statements and using them to build new ideas.

- **Harvesting:** capturing creative output with a deliberate method for categorising all creative output. At the end of a creative-thinking session, normally only those ideas that seem practical, and have obvious value, are noted.

- **Treatment of ideas:** developing and shaping ideas to make them more practical and valuable, and fitting them to an organisation or situation (APTT 2003).

These tools for enhancing creative thinking can be utilised in a Six Hats session when participants are wearing the green hat.

7. Narrative Patterning

Stories or narratives constantly surround us. As children we are told tales, in school we read and discuss stories, with our relatives we share accounts of family members and circumstances, through the media we are exposed to current affairs and world happenings, and as organisational members the proverbial grapevine keeps us abreast of what is going on in the organisation.

Stories, or narrative patterning, are a means of transferring tacit knowledge. They are used because they are more vivid than written statements, engaging, often entertaining, and have rich contextual details. They can have a greater impact than formal ways of transferring information. Stories create meanings and through meanings we can establish relationships between phenomena, occurrences and activities. Something that is meaningful is more easily recalled, particularly when connected to the listener's personal experience. Stories link things, people and time and engage both emotions and intuitions (Denning 2002). Moreover, narrative patterning can strengthen the bond between the listeners and the storyteller.

Denning (2001) refers to a springboard story, a narrative that enables a leap in understanding as to how an organisation or a community or a complex system may

change. Its impact is not so much in transferring large amounts of information, but through catalysing understanding and enabling listeners to step from a story in one context to a situation in a different context. It is important to note, however, that narrative patterning is not a 'silver bullet' for inducing organisational change and that the impact of a story can only be as good as the underlying idea it conveys.

In meetings, 'story circles' can be used when complex or futuristic scenarios are to be discussed. Participants sit in a circle and, one by one, tell how they envision the subject matter under discussion could fit into a given situation, or a future scenario. Depending on the context, creativity and wild ideas could be encouraged, or realistic and achievable parameters set. The storytelling continues until the participants can recognise patterns arising from the narratives, all participants are satisfied with the emergent patterns and they can be defined. Further discussion then focuses on the common narrative patterns identified. If problems are later identified with these patterns, they can be discarded and the story circle can be reiterated.

Companies such as Hewlett and Packard, Body Shop and Ford, make regular use of storytelling during employee induction, training, management meetings and farewell parties. People who leave the organisation are often invited back to share their experience and accumulated corporate knowledge in a form of storytelling. Through these stories people come to know what is important about the work they do and why they are doing it.

Although narrative-patterning principles are not used in the decision-making arena of the ADO there are examples where this technique has been successfully used. Recently narrative patterning was used during battle exercises to gain understanding into ways decisions are made in such situations. Stories were told to elucidate the culture of knowledge networks during the exercises and thus shed light on knowledge networks across the organisation. The outcomes of these stories, whether good or bad, served as building blocks for the Army continuous modification process and as a means of reflecting on current culture.

Narrative patterning can be introduced into the DWG in a number of ways, for example by:

- Using story circles at critical times during meetings (when discussing future scenarios or compatibility with existing capability).
- Inviting back respected, previous, members of DWG to talk about how decisions were reached at meetings and what they considered to be best practice.
- Asking SME about their war stories and their 'wish-lists' for capability in situations they have experienced.

8. Other Considerations

8.1 Communities of Practice

The DWG may be considered as teams that are dealing with complex problems and trying to both develop new knowledge and reach an agreed meaning of that knowledge in a socio-technical organisation (i.e., in the ADO). Recently Lawson & Cook (2003) explored the behaviour of groups of people working together towards an agreed goal, i.e. communities of practice. They take a systems perspective of team building and group dynamics addressing such issues as establishing, developing and maintaining effective groups, group structure and leadership. Their underlying premise is that an enterprise will fail unless the individual experts assembled to tackle the task form a 'community of practice'.

Lawson & Cook (2003) make the following conclusions for groups assembled to tackle complex socio-technical problems:

- Successful teams are those that have formed before they have to perform.
- Competence exists where there is a balance between cognitive intelligence, emotional intelligence and social awareness.
- The chairperson is not necessarily the sole source of leadership.
- Leadership is mobile and rests where there is a match between the capital of a particular team member and the problem to be solved.
- Structure and process emerges and codifies the match between capital and problems.

They further identify four sources of failure:

1. Where an unformed team is put on a task before the appropriate phases of team building and development have been carried out.
2. A preponderance of incompetent team members.
3. Where a previously successful leader is given a task in an area substantially outside of the realm of their expertise and experience.
4. Imposing a structure and process on a team that is inappropriate. Although a structure and process may have led to successful outcomes in the past it should not be imposed on teams that do not have the same distribution of expertise and experience.

8.2 Groupthink

In 1972, Irving Janis devised the term 'groupthink' to apply to the mode of thinking that people engage in when they operate in a cohesive group, and the members' drive for unanimity overrides their ability to objectively appraise alternative courses of action. According to Janis, groupthink leads to poor decision outcomes because of a dominant concurrence-seeking drive that suppresses critical inquiry (Neck & Moorhead 1995).

Janis and others have done considerable research since 1972 on antecedent conditions and groupthink symptoms. However, it is generally agreed that the major symptoms are:

- Having an illusion of invulnerability.
- Rationalising poor decisions.
- Believing in the group's morality.
- Sharing stereotypes that guide the decision.
- Exercising direct pressure on others.
- Not expressing true feelings.
- Maintaining an illusion of unanimity.
- Using mind-guards to protect the group from negative information.

Some possible countermeasures for groupthink include:

- Using a policy-forming group that reports to the larger group.
- Having leaders remain impartial.
- Using different policy groups for different tasks.
- Dividing into groups and then discussing differences.
- Discussing within sub-groups and then reporting back.
- Using outside experts.
- Using a Devil's advocate to question all the group's ideas.
- Holding a 'second-chance meeting' to offer one last opportunity to choose another course of action (Allyn & Bacon/Longman 2003).

8.3 Trust

Effective and efficient exchange of information underpins the successful operation of all organisational teams (Scott 1992; Hall 1977; Haslam 2001). Without such exchange, the collective action and cooperation necessary for the accomplishment of organisational goals is impossible. However, successfully eliciting information from individuals in organised contexts such as DWG, is often more difficult than it first appears. Barriers can emerge which obstruct an individual's willingness to volunteer information or to provide it to others on request. This is particularly so when the information of concern is considered valuable and deserving of care. For example, issues of ownership and concerns about how others might use such information often restrict an individual's readiness to part with it (Erickson 1979). Further, individuals often report feeling uncomfortable about contributing information in a group setting, particularly as 'advice', because doing so carries with it the risk of being regarded critically by others (see Warne, Agostino, Ali, Pascoe & Bopping 2003).

A large amount of organisational research has demonstrated that the extent to which an individual trusts another has a significant impact on their willingness to enter into an information exchange or disclosure relationship (e.g., Fine & Holyfield 1996; Ericson 1989). Despite the extensive empirical attention however, consensus on a definition of trust has not been forthcoming (Barber 1983; Kramer 1999). For present purposes, trust can be defined as the subjective expectation of positive treatment under conditions of vulnerability. In other words, we trust another to the extent that we believe they will act

beneficially (or at least not detrimentally) towards us if we choose to engage them in some form of cooperation (Gambetta 1988). Hence, trust is especially relevant when there is uncertainty or ignorance as to the motives and actions of others. When these can be predicted with absolute certainty, trust is not required - when they cannot, as in most 'real world' circumstances, a degree of trust is necessary to make human action and interaction possible. This is not to suggest that trust is only an input of successful human interaction. Organisational research has also considered trust as an important output of successful interaction, and in doing so has highlighted the role of social identification processes in its formation (see Haslam 2001).

In such contexts, information about the social and organisational categories to which members belong is critical in providing a basis for trust (Adams, et al. 2001, Haslam 2001; see also Ashforth & Mael 1989). Category-level information about others (e.g., "that person is a member of 'the intelligence corps', or 'the RAAF', or 'a civilian part of Defence'") provides a basis upon which assumptions can be made about their likely motives and actions. Hence, it is expected that category-level information and assumptions derived from it, will be especially important in the development of trust throughout a DWG's life, but particularly so during its formation. According to a social identity perspective (Tajfel & Turner 1979; Turner, Hogg, Oakes, Reicher & Wetherell 1987), the most effective group outcomes, including high levels of trust, will be achieved when the DWG itself becomes a significant and meaningful part of each group member's organisational identity - that is, when it emerges as a psychologically salient membership category (Haslam 2001). Therefore, throughout the life cycle of a DWG, attention must be paid to processes that underlie the development of a shared sense of identification amongst its members.

9. Evaluation of Options

Evaluating the various approaches for distilling the best advice from SME is a highly subjective process. The nature and context of the advice sought (in this case advice for the acquisition of Defence capabilities), the political climate and organisational culture may all have a bearing on the potential efficacy of the methods considered. Rather than evaluate the various options presented here with a view to recommending the best one, the approach taken was to provide information that would assist those managing the process to select an appropriate method. Through discussions with stakeholders it was established that concerns in forming and running DWG included the potential for:

- The DWG to become 'stove-piped' and not consider options in the broad context of joint operations and not taking account of the other domains.
- A focus on existing projects rather than broadly considering alternatives.
- Individuals to dominate a DWG.
- Groupthink.

In addition the attributes chosen should provide the means to evaluate which approaches could be efficiently applied and lead to better decision-making. Through discussion

between the authors, and with the sponsor of this work, six attributes were chosen to provide some means to assess process efficiency and the efficacy of decision-making. Concerns raised by stakeholders were also taken into account. The six attributes chosen and evaluated in Table 1 are explained in the notes below the table. No weightings are applied as it is felt that those managing the DWG process are in a better position to judge the relative importance of these attributes in the light of political, organisational and cultural considerations.

For the process of evaluation the authors rated each attribute for each approach then held a special session during which individual ratings were discussed and a consensus evaluation established. There was a high degree of congruence in the individual evaluations of the authors hence a consensus evaluation was readily achieved.

Table 1: Evaluation of Methods for Distilling Best Advice from Subject Matter Experts.

	Facilitated Meetings			Delphi Approaches		Decision Conferencing	Focus groups	Nominal Group Technique	De Bono	Story Circles
	Std	Computer support	Rules based	Std	CIA					
Inclusiveness										
Openness										
Creativity										
Breadth										
Time Commitment										
Temporal Efficiency										

Notes on Colour Code used:

RED denotes that the approach is evaluated as being unlikely to adequately meet the criterion; AMBER indicates it may meet the criterion to some extent and GREEN signifies that the approach is likely to meet that criterion effectively.

Notes on Evaluation Criteria:

1. The Inclusiveness attribute assesses the degree to which all participants are included in the meeting in an effective and balanced way.
2. 'Openness' is the ability of the approach to generate an environment where participants can talk freely and frankly, without fear of blame or ridicule.
3. Creativity estimates the degree to which the approach creates an environment that facilitates creative thought and innovation.
4. Breadth determines whether or not a broad range of topics or issues can be dealt with and a wide range of options evaluated.
5. Time Commitment refers to the total amount of time participants must commit to the process.
6. Temporal Efficiency assesses how efficiently time is used during group meetings.

10. Conclusions and Recommendations

In choosing an appropriate approach for running and managing the DWG it is worth noting the following:

1. Computer support for facilitated meetings can significantly improve their inclusiveness, creativity and breadth.
2. The Delphi method has some serious deficiencies with respect to efficiency (time use and management) and its ability to broadly consider alternatives.
3. While both Decision Conferencing and Story Circles look promising they can involve a considerable time commitment and could be inefficient if not effectively applied.

The approaches outlined have often been developed and applied in situations, organisations and contexts markedly different from those of the DWG. It would thus be advisable to test and prototype the approach chosen before adopting it for all DWG. Here two approaches may be considered:

- Select an existing DWG as the subject for test and prototyping.
- Synthesise a DWG for testing and prototyping.

It is further recommended that consultants familiar with the approach chosen be hired to prototype, develop, tailor and set-to-work the method for use by the DWG.

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Structuring, Organising and Running Meetings to Distil the Best Advice from Subject Matter Experts

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It is understood that the Domain Working Groups (DWG), formed to review the Defence Capability Plan, are to meet regularly. An important consideration is how best to structure, organise and run DWG meetings so as to distil the best advice from the subject matter experts (SME) in each domain. Hence this report reviews, discusses and evaluates the following approaches to distilling SME knowledge: the Delphi Method; Cross-Impact Analysis (CIA); Facilitated meetings with and without computer support, as well as less-structured Rules-Based meetings; Decision Conferencing; group discussion techniques like Focus Groups and Nominal Group Technique; de Bono's Six Hats; and finally, Story Circles. Other aspects of groups discussed in this report include Communities of Practice, Group Think and Trust.